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T247B

MODEL T247B
CALIBRATION CHECKER
OPERATING INSTRUCTIONS

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# MODEL T247B
# CALIBRATION CHECKER
# OPERATING INSTRUCTIONS

## WARRANTY

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# 1.0 GENERAL

## 1.1 Description

1.1.01 The Model T247B Calibration Checker is a compact, lightweight test set designed for field calibration and function checking of all the various models of the Wilcom T136 Circuit Test Sets including T136Z-mod, T336 and T337. Individual switch selected outputs are provided for checking proper function of the T136* under test in DIAL, LOOP mA, CKT LOSS, CKT NOISE, and PWR INFL. The internal switching of the T247B provides the required interconnection of the T136 input leads for each function. The T247B is powered by 115V ac.

1.1.02 In the CKT LOSS, CKT NOISE, and PWR INFL functions, the T247B sends five tones, switch selectable, between 325 Hz and 4000 Hz. The 1000 Hz CKT LOSS and CKT NOISE outputs are at precise levels suitable for level calibration of the CKT LOSS and CKT NOISE circuits in the T136. The other outputs are less precise, but are sufficiently accurate to permit verification of the proper function of the T136. In CKT LOSS, the output level is the same for all five frequencies to permit checking the flat response of the T136. In CKT NOISE and PWR INFL, the output levels are set to the inverse of C-message weighting, so that a properly functioning T136 will indicate reference level (30 dBrnc CKT NOISE or 90 dBrnc PWR INFL), within allowable tolerance, for any selected frequency.

1.1.03 A reference check point at -8.5 dBm, as required by PUB 55020, is provided in addition to the 0 dBm point.

1.1.04 The T247B also includes a 3-position, 10 dB per step, LEVEL switch which permits setting the output level 10 dB above or below the normal reference level. This switch is used with certain T136 models which have a different reference level, and also for checking the range extender push-buttons on the T136. A HUM REJECT TEST pushbutton adds a 180 Hz interference tone in the CKT LOSS function to verify the low frequency reject characteristic of the T136 CKT LOSS circuit. In DIAL function, a light emitting diode on the T247B panel labeled DIAL HOLD O.K. will be on if the measuring set is drawing at least 20 mA dc. In the LOOP mA function, precise twO-point calibration at 20 mA and 80 mA into 430 OHMS is provided for checking the LOOP mA function in the T136 Z-mod. Other T136 test sets (not Z-mod) should read 22 mA in the 20 mA position and off scale in the 80 mA position. A FROGGING switch reverese the connection to T and R leads of the T136. This is needed to check proper polarity for dc LOOP mA measurement in those T136's not equipped with a polarity bridge. Also, in CKT LOSS, CKT NOISE an unbalancing fault in the T136 will show up as an error in one position or the other of the T247B FROGGING switch.

1.1.05 The T247B output is balanced and provided with dc feed during all ac measurement checks. This makes it possible to use T247B for checking calibration of measuring sets with electronic hold.

* "T136" hereinafter includes Z-mod T336 and T337.

## 2.0 SPECIFICATIONS

### 2.1 dc OUTPUTS

2.1.01 DIAL function: Continuity check

2.1.02 LOOP mA function: 20.0 mA and 80.0 mA (switch selectable), 0.5% into a 430 OHM load.

NOTE: This check provides a 50 volt nominal source through selectable resistance to produce the specified current in a 430 OHM load. When the T247B LOOP mA source is applied to a T136 (not Z-Mod) Circuit Test Set, the reading should be 22 mA in the 20 mA position and off-scale in the 80 mA position.

2.1.03 All ac measurement functions: 50V dc through 1500 OHMS, or approximately 26 mA into 430 OHMS.

### 2.2 ac OUTPUTS

2.2.01 FREQUENCY: 325 Hz, 500 Hz, 1000 Hz, 3000 Hz, 4000 Hz, all +1%, switch selectable.

2.2.02 OUTPUT IMPEDANCE:

CKT LOSS & CKT NOISE: 600 OHM, balanced, to terminals marked GRN and RED.

PWR INFL: Low impedance; terminals marked GRN and RED are both connected to high side of output, terminal marked YEL to low side.

2.2.03 CKT LOSS: Ref. at 1000 Hz: -8.5 dBm ~~+0.5~~ ±0.05 dB * dB at other frequencies: -8.5 dBm +0.1 dB.

CKT NOISE: Ref. at 1000 Hz: 30.0 dBrnc ~~+.1~~ ±.1 dB * dB at other frequencies: 30 dBrnc +.3 dB (Voltage output varies with inverse of C-Message weighting for flat dBrnc output.)

PWR INFL: (Voltage output; at 1000 Hz, 0 dBrnc is defined as 24.5 uV.)

Ref. at 1000 Hz: 80 dBrnc +.2 dB at other frequencies: 80 dBrnc +.5 dB (Voltage varies with inverse of C-Message weighting.)

* As per Dawn Swain
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12/10/93

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CHANGES HAVE BEEN MADE ON THIS PAGE.
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SEE ISSUE SHEET.

2.3 LEVEL Switch: Three position:

1. 10 dB +.1 dB above Ref.
2. Ref.
3. 10 dB +.1 dB below Ref.

2.4 HUM REJECT TEST push button: 60 Hz line frequency at 10 dB above signal added to output in CKT LOSS function. The Test Set should reject this frequency sufficiently that level reading increases less than 0.5 dB.

NOTE: Hum test does not function when 10 dB ABOVE REF is selected.

2.5 POWER: 115V, 50/60 Hz or -44V to -52V office battery.

2.6 ENVIRONMENTAL: Operating Temperature: 0 to 50 $^{o}$C
for full specified accuracy: +15 $^{o}$C to +40 $^{o}$C

Humidity: 95% at 35 $^{o}$C
50% at 50 $^{o}$C

Storage Temperature: -55 $^{o}$C to +70 $^{o}$C

Altitude (non-operating ): 50,000 Ft.

2.7 SIZE: Portable case, 11" wide x 8" high x 8 1/2" deep, including cover, handle, wall mounting bracket, and feet.

2.8 WEIGHT: 8 lbs.

## 3.0 PANEL CONTROLS AND CONNECTIONS

### 3.1 General

3.1.01 This section describes the function of each switch, lamp and connector located on the front panel of the Model T247B Calibration Checker. Figure 3-1 will identify the items of the text by the designation numbers appearing on the schematic diagram.

### 3.2 Power Related Controls and Connections

3.2.01 ac power receptacle - This is a 3-prong male plug recessed behind the front panel located in the lower right corner. The line cord supplied with the test set supplies 115V ac power to the test set through this connection.

3.2.02 1/2 AMP/ Fuse - The twist-lock fuse holder is located to the left of the power receptacle. This 1/2 ampere fuse provides ac protection to the test set. When replacing this Fuse, do not exceed the 1/2 ampere rating.

3.2.03 Power Switch - The ON-OFF switch is located in the lower center section of the panel. The switch performs the ON-OFF function to apply power to the test set.

### 3.3 Function Related Controls and Connections

3.3.01 T136 LEADS: GRN, RED, YEL - These three binding posts, located in the lower left section of the panel, provide the connecting points for the clip leads of the T136 being tested.

3.3.02 FROGGING: REVERSE, NORMAL - This switch, located above the binding posts, interchanges the internal electrical connections to the GRN and RED binding posts.

3.3.03 FUNCTION Switch - This switch is located in the left center of the panel. It selects the function of the T136 to be tested. The internal connections to the binding posts are switched to provide the proper signal configuration for the individual functions. These include:

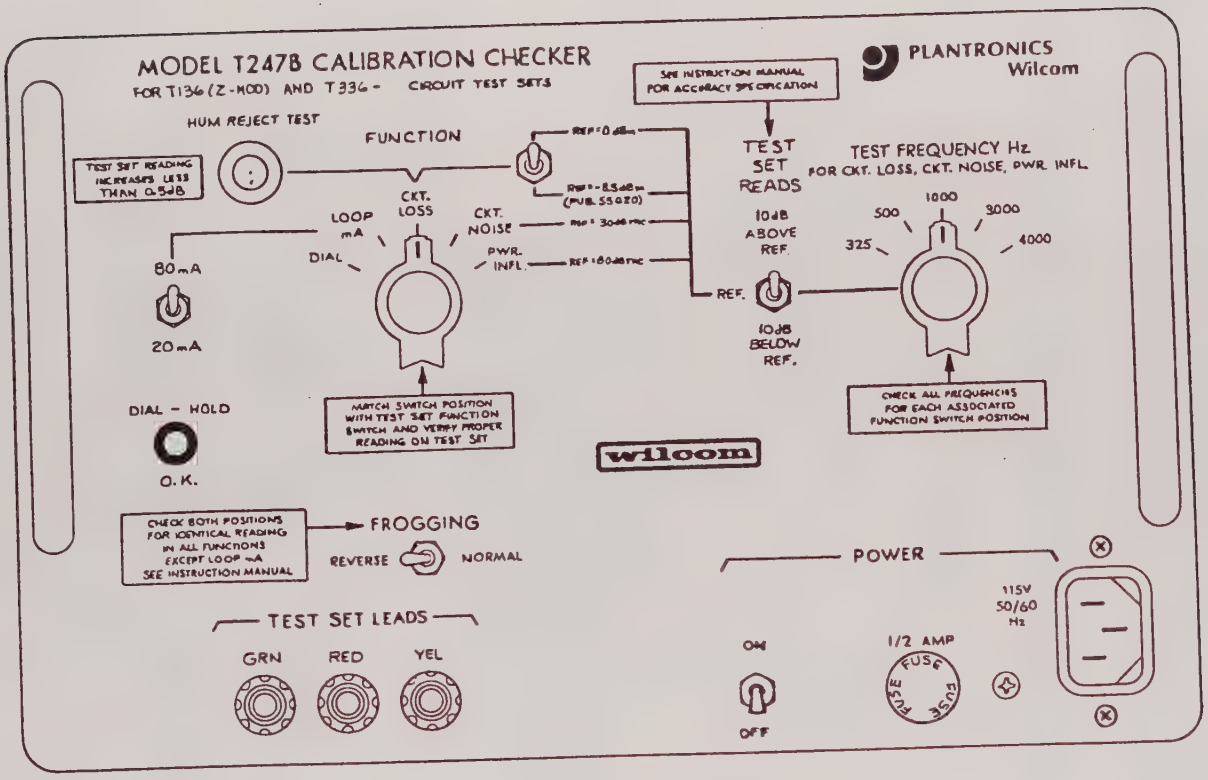
1. DIAL
2. LOOP mA
3. CKT. LOSS
   (A reference point at -8.5 dBm, as required by PUB 55020, is provided in addition to the 0 dBm point)
4. CKT. NOISE
5. PWR. INFL.

3.3.04 DIAL - HOLD O.K. Lamp - This lamp when illuminated, verifies the continuity of the DIAL function of the T136 and indicates the measuring set is drawing at least 20 mA dc.

3.3.05 HUM REJECT TEST Pushbutton - This pushbutton switch adds a 180 Hz interference tone in the CKT LOSS function to verify the low frequency reject characteristics of the T136.

3.3.06 TEST FREQUENCY Hz Switch - This switch is located in the right center of the panel. The switch selects one of five fixed internal oscillator frequencies to be applied to the T136 for verification of its frequency response or weighting characteristic.

3.3.07 LEVEL Switch - This switch, located in the right center of the panel, selects the reference level at 1000 Hz for the CKT LOSS< CKT NOISE, and PWR INFL functions. The REF (reference) level for each function is indicated on the panel.


MODEL T247B CALIBRATION CHECKER
FOR T136(Z-H00) AND T336- CIRCUIT TEST SETS
PLANTRONICS
Wilcom
SEE INSTRUCTION MANUAL FOR ACCURACY SPECIFICATION
HUM REJECT TEST
TEST SET READING INCREASES LESS THAN 0.5dB
FUNCTION
REF = 0 dBm
REF = -8.5dBm (PUB. 55020)
CKT. LOSS
CKT. NOISE
PWR. INFL.
LOOP mA
DIAL
80mA
20mA
TEST SET READS
10dB ABOVE REF.
REF.
10dB BELOW REF.
TEST FREQUENCY Hz
FOR CKT. LOSS, CKT. NOISE, PWR. INFL.
500
1000
3000
325
4000
MATCH SWITCH POSITION WITH TEST SET FUNCTION SWITCH AND VERIFY PROPER READING ON TEST SET
CHECK ALL FREQUENCIES FOR EACH ASSOCIATED FUNCTION SWITCH POSITION
DIAL - HOLD
O.K.
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CHECK BOTH POSITIONS FOR IDENTICAL READING IN ALL FUNCTIONS EXCEPT LOOP mA SEE INSTRUCTION MANUAL
FROGGING
REVERSE
NORMAL
POWER
115V 50/60 Hz
ON
OFF
1/2 AMP
FUSE
TEST SET LEADS
GRN
RED
YEL

FIGURE 3-1

## 4.0 OPERATING INSTRUCTIONS

4.1 Power: For operation, connect the line cord, supplied with the set, to the recessed male connector on the front panel. The other end may be plugged into any 115 volt three-wire convenience outlet.

4.2 Test Set-up:

4.2.01 Set the Circuit Test Set FUNCTION switch to the BATT TEST position, if one is provided. Push the PUSH TO MEAS button and observe a meter reading in the GOOD BATT portion of the scale, or note that LO BATT does not appear on the digital readout. Replace the batteries if required.

4.2.02 Connect the clip leads of the Circuit Test Set (RED, GRN, and YEL) to the binding posts on the T247B identified by the same colors.

4.2.03 Set the T247B Controls as follows:

| | | |
|---|---|---|
| 1) | FUNCTION | DIAL |
| 2) | LEVEL | REF |
| 3) | REF | 0 dBm |
| 4) | TEST FREQUENCY Hz | 1000 |
| 5) | 80 mA/20 mA | 20 mA |
| 6) | FROGGING | NORMAL |
| 7) | POWER | ON |

4.2.04 Set the Circuit Test Set FUNCTION switch to the DIAL position.

NOTE: The T247B and Circuit Test Set are now set-up to perform the first functional check, for DIAL operation. The checks for the remaining four functions and for the range extenders should be performed sequentially to insure the correct positioning of all switches.

4.3 Test Procedures

4.3.01 DIAL Check -

| STEP | WHAT TO DO | RESULT | TOLERANCE |
|---|---|---|---|
| 1 | Complete Test set-up 4.2 | - | - |
| 2 | Short Circuit Test Set DIAL terminals with cliplead. | O.K.: LED illuminates. | |

4.3.02 LOOP mA CHECK -

| STEP | WHAT TO DO | RESULT | TOLERANCE |
|---|---|---|---|
| 1 | Set the T247B FUNCTION switch to the LOOP mA position. | - | - |
| 2 | Set the Circuit Test Set switch to the LINE mA/LOOP mA position. | Meter indicates 20 mA | +0.6 mA |
| | | For Non Z-Mod T136's: 22 mA | +2 mA |
| 3 | Set FROGGING switch to the REVERSE position. | Meter indicates 20 mA for the following test sets: Z-Mod: T136BSB, T136BSC, T136BPT. | +0.6 mA |
| | | Meter pegs against the left pin for the following test sets: T136B, T136B-1, T136B-2, T136BC, T136BF, T136BNY, T136U-04. | - |
| | | Reading: -20 mA for T336/T337 | +0.6 mA |
| 4 | Return FROGGING switch to the NORMAL position. | - | - |
| 5 | For T136U-04 only. Press the PUSH FOR mA X2 button on the T136 | The T136 meter indicates 11.0 mA (NOT Z-MOD) | +3.8 mA |
| 6 | Repeat at 80 mA | Meter reads 80 mA (off-scale for Non Z-Mod T136's) | +2.0 mA |

NOTE: To calibrate: Adjust Circuit Test Set dc termination (420 OHMS) for correct 80 mA reading; then adjust mA sensitivity for correct 20 mA reading. Repeat until both readings are within tolerance.

4.3.03 CKT LOSS Check -

| STEP | WHAT TO DO | RESULT | TOLERANCE |
|---|---|---|---|
| 1 | Set the T247B and the Circuit Test Set FUNCTION switches to the CKT LOSS position. | DIAL HOLD OK LED illuminates. | - |
| 2 | Press the Circuit Test Set PUSH TO MEAS button | Meter indicates 0 dBm. | +0.2 dB* |
| 3 | Repeat step 2 for each position of the T247B TEST FREQUENCY Hz SW. | Meter indicates 0 dBm at each freq. | +0.2 dB |
| 4 | Repeat 2 and 3 at REF = -8.5 dBm | -8.5 dBm | +0.2 dB |
| 5 | Set the FROGGING switch to the REVERSE position. | - | - |
| 6 | Repeat steps 2 through 4. | Meter indicates 0 dBm or -8.5 dBm at each freq. | +0.2 dB |
| 7 | Return the TEST FREQ. Hz switch to the 1000 pos., and REF to 0 dBm. | - | - |
| 8 | While holding the T136 PUSH TO MEAS button, press the T247B HUM REJECT TEST button. | Meter reading increases less than 0.5 dB | |

*NOTE: If this tolerance is not met, it is possible to adjust the gain of the Test Set. Refer to the Test Set Instruction Manual.

NOTE: For T136BC and T136U-04, use the 10 dB BELOW REF LEVEL switch position to check at -10 dBm. The check at -8.5 dBm is specified in PUB 55020.

4.3.04 Range Extender Check - For T136BSB, T136BSC, T136BPT Test Sets.

| STEP | WHAT TO DO | RESULT | TOLERANCE |
|---|---|---|---|
| 1 | Press both the T136 PUSH TO MEAS and +10 dB | The T136 meter indicates -10 dBm. | +1 dB |
| 2 | Set the T247B LEVEL switch to the 10 dB ABOVE REF position. Press both the T136 PUSH TO MEAS and +10 dB buttons. | The T136 meter indicates 0 dBm. | +0.5 dB |
| 3 | Set the T247B LEVEL switch to the 10 dB BELOW REF position. Press both the PUSH TO MEAS and -10 dB buttons. | The T136 meter indicates 0 dBm. | +0.5 dB |
| 4 | Return the T247B LEVEL switch to the REF position. | - | - |

NOTE: For Circuit Test Sets having different range extender buttons, these instructions may be modified to suit.

4.3.05 CKT NOISE Check -

| STEP | WHAT TO DO | RESULT | TOLERANCE |
|---|---|---|---|
| 1 | Set the T247B and the Circuit Test Set FUNCTION switches to the CKT NOISE position. | DIAL-HOLD O.K. illuminates. | - |
| 2 | Press the PUSH TO MEAS button. | Meter indicates 30 dBrnc. | +0.3 dB* |
| 3 | Repeat step 2 for each position of the T247B TEST FREQUENCY Hz Switch. | Meter indicates 30 dBrnc at each frequency. | 325 Hz: +1.8 dB<br>500 Hz: +1.8 dB<br>1000 Hz: +0.3 dB<br>3000 Hz: +2.8 dB<br>4000 Hz: +3.8 dB |
| 4 | Repeat steps 2 and 3 with T247B LEVEL switch in 10 dB BELOW REF position. | Meter indicates 20 dBrnc at each frequency. | 325 Hz: +1.8 dB<br>500 Hz: +1.8 dB<br>1000 Hz: +0.3 dB<br>3000 Hz: +2.8 dB<br>4000 Hz: +3.8 dB |
| 5 | Set the FROGGING switch to the REVERSE position. | - | - |
| 6 | Repeat steps 2 through 4 | | |
| 7 | Return the TEST FREQ. Hz switch to the 1000 position, and the FROGGING switch to the NORMAL position and the LEVEL switch to the REF position. | - | - |

*NOTE: If this tolerance is not met, it is possible to adjust the gain of the Test Set. Refer to the Test Set Instruction Manual.

4.3.06 PWR INFL Check -

| STEP | WHAT TO DO | RESULT | TOLERANCE |
|---|---|---|---|
| 1 | Set the T247B and the Circuit FUNCTION switches to the PWR INFL position. | DIAL HOLD OK illuminates. | - |
| 2 | Set the T247B LEVEL switch to 10 dB ABOVE REF. | | |
| 3 | Press the PUSH TO MEAS button. | Meter indicates 90 dBrnc. | +0.5 dB |
| 4 | Repeat step 2 for each position of the T247B TEST FREQUENCY Hz switch | Meter indicates 90 dBrnc at each frequency | 325 Hz: +2.0 dB<br>500 Hz: +2.0 dB<br>1000 Hz: +0.5 dB<br>3000 Hz: +3.0 dB<br>4000 Hz: +4.0 dB |
| 5 | Set LEVEL switch to REF. | | |
| 6 | Repeat steps 2 - 4 for each position of the T247B TEST FREQUENCY Hz switch | Meter indicates 80 dBrnc at each frequency | 325 Hz: +2.0 dB<br>500 Hz: +2.0 dB<br>1000 Hz: +0.5 dB<br>3000 Hz: +3.0 dB<br>4000 Hz: +4.0 dB |
| 7 | Set the FROGGING switch to the REVERSE position. | - | - |
| 8 | Repeat steps 2 - 6. | | |
| 9 | Return the TEST FREQUENCY Hz switch to the 1000 position on the FROGGING switch to the NORMAL pos. | - | - |

NOTE: For T336B and T337, repeat with LEVEL switch at 10 dB BELOW REF. Reading should be 70 dBrnc with the same tolerance.

4.4 Test Failure - If the Test Set fails to operate or meet a specific tolerance of the Test Procedures, it should be calibrated or repaired, as required.

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# DIFFERENCE DATA

PRODUCT T247B Calibration Checker

ASSEMBLY Section 2.0 Specifications

| CHANGE | DESCRIPTION |
|---|---|

Section 2.2.03

Delete: CKT LOSS: Ref. . . . . etc.
CKT NOISE: Ref. . . . . etc.
PWR INFL: (. . . .) etc.
Ref. . . . . etc.

Section 2.3

Delete: LEVEL SWITCH: Three position
1. 10 dB +/- .1 dB above Ref.
2. Ref.
3. 10 dB +/- .1 dB below Ref.

Section 2.2.03

ADD: OUTPUT LEVEL:
CKT LOSS: (TEST SET READS switch in REF position)
REF = -8.5 dBm:
At 1000 Hz: -8.5 dBm +/-0.05 dB
At other frequencies: -8.5 dBm +/- 0.2 dB

REF = 0 dBm: 0 dBm +/-0.2 dB

CKT NOISE: (TEST SET READS switch in REF position)

At 1000 Hz: 30.0 dBrnC +/-0.1 dB
At 4000 Hz: 30.0 dBrnC +/-0.5 dB
At other frequencies: 30.0 dBrnc +/-0.3 dB

(NOTE: Output level is inverse C-MSG weighted, to provide an output that is flat when measured in dBrnc.)

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# DIFFERENCE DATA

PRODUCT T247B Calibration Checker

ASSEMBLY Section 2.0 Specifications

| CHANGE | DESCRIPTION |
|---|---|

Section 2.2.03 (continued)

PWR INFL: (TEST SET READS switch in REF position)

At 1000 Hz: 80 dBrnC +/-0.2 dB
At 4000 Hz: 80 dBrnC +/-1.0 dB
At other frequencies: 80 dBrnC +/-0.5 dB

(NOTE: Inverse C-MSG weighted voltage output, flat when measured in dBrnC. At 1000 Hz, 0 dBrnC PWR INFL is defined as 24.5 uV.)

TEST SET READS switch:

Increases or decreases CKT LOSS, CKT NOISE, or PWR INFL output level by 10.0 dB +/-0.2 dB.

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|---|---|
| Revision Number: A_ B_ C_ D_ E_ | Page: N/A |
| Prepared By: Rick Schultz | Approved By: |
| Issued By: Jim Steinau | Issue Date: 10/19/93 |

## CHANGE NOTICE SUMMARY

| Revision | Reason for Change | Date of Change |
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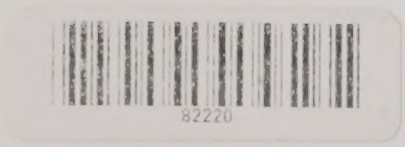
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